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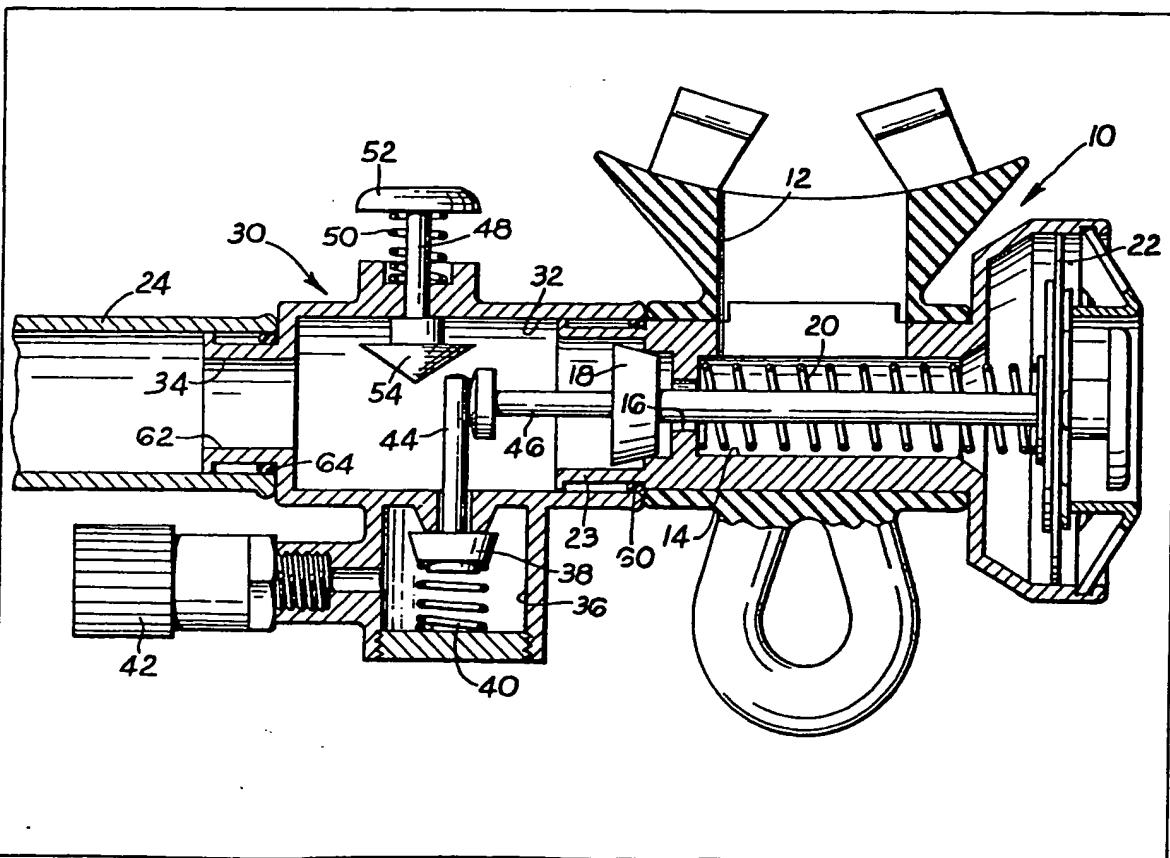
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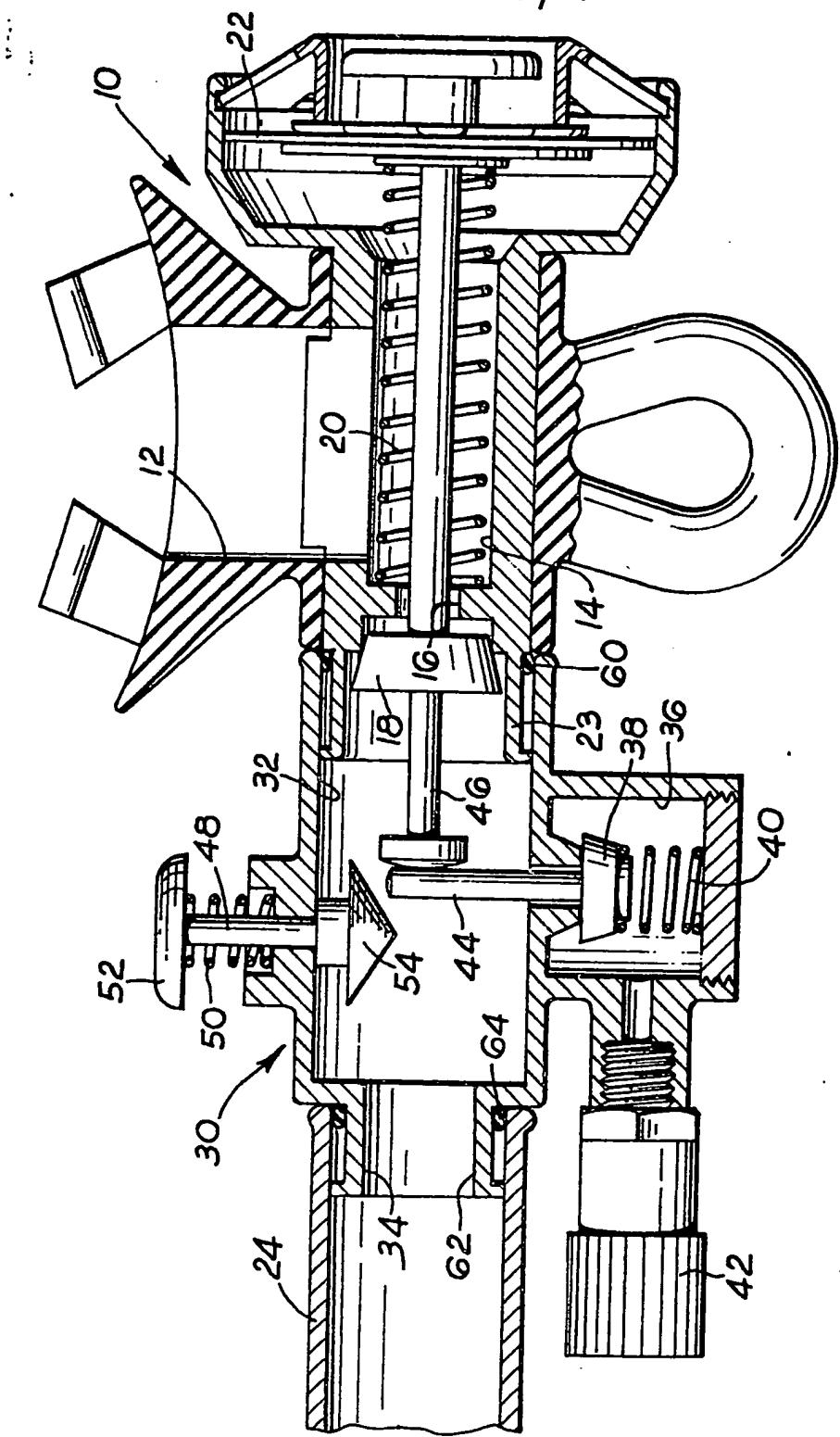
(54) Breathing device

(57) A coupling (30) serves to connect a mouthpiece (10) and a buoyancy chamber via pipe (24) to a source of breathable air via (42) such as an air supply cylinder. The coupling (30) includes a tilt valve (38) which is opened automatically in response to suction applied at the mouthpiece (10). The valve (38) can also be opened under manual control by means of button (52) to admit air into the buoyancy chamber via pipe (24) independent of mouthpiece (10) to vary the buoyancy in the chamber.



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SPECIFICATION

Breathing device

5 This invention relates to a breathing aid for use in conjunction with diving suits of the type which can admit air to allow variation of buoyancy, lifejackets and such like.

In our prior Patent No. 1414265 we disclosed a wet suit incorporating a buoyancy chamber adapted to be connected to the air supply via a demand regulator and having an auxiliary mouth piece connected to the chamber by a hose for use for example by a second diver in an emergency. The drawback with this known arrangement is that the control valve controlling air admission into the buoyancy chamber has to be operated continually to maintain sufficient quantity of breathable air in the chamber when the auxiliary mouthpiece is in use. Also, two connections to the buoyancy chamber have to be made, i.e. one to the mouthpiece via a hose and one to the demand regulator.

25 The present invention seeks to overcome the above drawbacks and accordingly we provide a coupling for connection with a source of breathable air, a mouth piece and a buoyancy chamber, the coupling being operable automatically in response to a breathing intake action being applied to the mouthpiece to connect the mouthpiece to said source and the coupling including an actuator for connecting the source to the chamber independently of the mouthpiece when air is to be applied to the latter for the purpose of varying buoyancy.

In the preferred embodiment, the coupling is formed as a separated component from the mouthpiece and is adapted to be interposed between the latter and a hose attached to the buoyancy chamber, the coupling also including an inlet connectible by means of a quick release fastening to a pipe associated with a demand regulator.

Conveniently the inlet for connection to the demand regulator is provided with a tilt valve which is displaceable to the open position either by means of a diaphragm operated valve member of the mouthpiece or by the previously mentioned actuator which may comprise a springloaded button having a cam portion cooperable with the tilt valve.

One example of the invention is shown in the accompanying drawing to which reference is now made.

Referring now to the drawing, the assembly comprises a commercially available form of mouthpiece 10 having an intake opening 12 communicating with a bore 14 into which air can enter through a port 16 controlled by a diaphragm operated valve 18 which is biased to the closed position by a spring 20 and opens in response to deflection of the diaphragm 22 by air withdrawal at intake 12.

The mouthpiece terminates in a connector spigot 23 which, in conventional use of the mouthpiece, is inserted into a hose 24 connected to a buoyancy chamber of a diving suit, lifejacket of the like, e.g. as shown in our prior patent No. 1414265. The mouthpiece 10 is additional to the mouthpiece connected directly to the air cylinder via the demand regulator and is intended to act as an auxiliary mouthpiece for use in emergency circumstances.

In accordance with the present invention, instead of connecting the buoyancy chamber to the breathable air supply by a separate connection thus necessitating two connection points to the buoyancy chamber, a coupling 30 is provided which is interposed between the auxiliary mouthpiece and the hose 24. The coupling 30 comprises a pair of outlets 32, 34 for communication respectively with the mouthpiece and the hose and an inlet 36 controlled by a tilt valve 38 which is springloaded into the closed position by spring 40.

90 The inlet 36 is adapted for connection to the air supply cylinder, via the demand regulator, by means of a quick release connector 42. The tilt valve 38 includes a stem 44 which extends into the main body of the coupling 30 and into the path of movement of an extension 46 attached to the valve 18 so that when the latter moves to the left, as seen in the drawing, the stem 44 is deflected laterally thereby tilting the valve 38 and allowing admission of air into the main cavity in the coupling 30 and thence into the mouthpiece 10. In other words, in response to a breathing intake action being applied to the auxiliary mouthpiece 10, the valve 18 opens and the valve 38 is tilted to its open position by engagement with extension 46 thereby creating a flow path from the air cylinder to the intake opening 12.

The coupling 30 also includes an actuator 110 48 comprising a button which is springloaded upwardly by spring 50. The button 48 includes a head 52 accessible externally of the coupling 30 and terminates in a cam portion 54 which is cooperable with the stem 44 of the tilt valve 38 in such a way that, when the button 48 is pressed inwardly of the coupling 30, the stem 44 is displaced with consequent opening of the valve 38. In these circumstances, an air flow path is created between the air cylinder and the hose 24 via the coupling 30. Thus, when the user wishes to increase buoyancy, the button 48 is operated to connect the buoyancy chamber to the air cylinder. It will be noted that in these circumstances, the valve 18 remains closed.

The righthand portion of the coupling 30 is dimensioned so as to receive the spigot portion 23 of the mouthpiece as a tight fit and a sealing ring 60 may be provided to ensure a proper seal between the coupling 30 and the

mouthpiece. At its opposite end, the coupling 30 is provided with a spigot portion 62 of similar configuration to the spigot portion 23 of the mouthpiece for insertion into the hose

5 24. Again, a sealing ring 64 may be provided to ensure proper sealing.

CLAIMS

1. A coupling for connection with a source 10 of breathable air, a mouth piece and a buoyancy chamber, the coupling being operable automatically in response to a breathing intake action being applied to the mouthpiece to connect the mouthpiece to said source and
- 15 2. The coupling including an actuator for connecting the source to the chamber independently of the mouthpiece when air is to be applied to the latter for the purpose of varying buoyancy.
- 20 3. A coupling as claimed in Claim 1 in which the coupling is formed as a separate component from the mouthpiece and is adapted to be interposed between the latter and a hose attached to the buoyancy chamber.
- 25 4. A coupling as claimed in any one of Claims 1-3 in which the inlet for connection to the demand regulator is provided with a tilt valve which is displaceable to the open position either by means of a diaphragm operated valve member of the mouthpiece or by the previously mentioned actuator.
- 30 5. A coupling as claimed in Claim 4 in which said actuator comprises a springloaded button having a cam portion cooperable with the tilt valve.
- 35 6. A coupling substantially as hereinbefore described, with reference to, and as shown in the accompanying drawings.